

# Bram Grooten

*PhD candidate in Deep Learning*



Passionate PhD researcher, working on dynamic sparse training of neural networks, specifically in the field of deep reinforcement learning, transfer learning, and robotics. Currently using the continuous control tasks from MuJoCo, OpenAI Gym, DMControl to benchmark my ideas. Throughout the PhD project I will translate research findings into the application domain of autonomous driving.

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🐙 [github](#) [in linkedin](#) 🎓 [scholar](#)

## Education

- 2018 – 2021 **Master Applied Mathematics**, *Eindhoven University of Technology (TU/e)*  
Graduated cum laude. Thesis on multi-agent deep reinforcement learning for Hanabi.
- 2018 – 2021 **Master Science Education**, *Eindhoven University of Technology*  
Acquired the official license to teach mathematics in Dutch high schools.
- 2014 – 2017 **Bachelor Applied Mathematics**, *Wentworth Institute of Technology & TU/e*  
Studied abroad in Boston US, after which I continued in the Netherlands.
- 2008 – 2014 **High school**, *Sint-Joriscollege*, Eindhoven, Graduated cum laude  
Bèta award: student with the highest grades in STEM courses.

## Recent Projects

- 2023 **Research Visit**, *Aug - Dec*, [UAlberta](#)  
Currently visiting the University of Alberta, joining Matthew Taylor's Intelligent Robot Learning (IRL) Lab at the Alberta Machine Intelligence Institute (Amii).
- 2023 **DLRL at Mila**, *Jul*, [drl.ca](https://drl.mila.queensu.ca/)  
Accepted at the Deep Learning Reinforcement Learning summer school, which is held at the Mila research institute in Montreal, Canada.
- 2022 **European Summer Schools**, *Jun - Jul*  
Participated in three machine learning summer schools: [MLSS](#), [EEML](#), and [M2L](#). Presented my research there (see [poster](#)) and at the Sparse Neural Networks ([SNN](#)) workshop.
- 2022 **Multi-Agent RL Competition**, *Mar - Jun*, [AI Arena](#)  
Achieved a prize-winning top 10 ranking in this global contest, among universities of Alberta, Melbourne, Toronto, Yale, and others. With 4 graduate students we developed a deep RL agent to compete in their multiplayer online battle arena.
- 2020 – 2021 **Serpentine AI**, *Sep - Aug*, [serpentine.ai](https://serpentine.ai)  
Chairman of the student team which develops AI for e-Sports. Led the team through many international AI programming competitions. Learned to work with PyTorch and TensorFlow, program in Python, Java, C++, and collaborate via Git.

- 2020 **Angry Birds Competition**, Jun - Aug, [AI Birds.org](#)  
Winning team in this challenging level generation contest.
- 2020 **AI Snakes Competition**, Mar - May, [Technical Report](#)  
Leader of the Serpentine team that finished in second place.
- 2020 **MIT Battlecode**, Jan - Feb, [battlecode.org](#)  
Programming competition hosted by MIT where we reached the top 30.
- 2018 – 2020 **Technology Ambassador**, [bramgrooten.nl/gastles](#)  
Bringing tech-enthusiasm to children with our guest lecture: Make your own app!

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## Work experience

- Nov 2021 – now **PhD Candidate**, *Eindhoven University of Technology*, Netherlands  
Research focussed on dynamic sparse training in deep reinforcement learning, improving the efficiency of neural networks. The project has applications in autonomous driving.
- Feb – Dec 2019 **Math Teacher**, *Maaslandcollege & Van Maerlantlyceum*, Oss & Eindhoven  
During the Education master I learned the teaching craft in these two internships.
- Jul – Oct 2017 **Researcher**, *ThuisBaas*, Amsterdam, Netherlands  
I analyzed the sound level of heat pumps and improved their solar energy model.
- Feb – May 2015 **Tutor**, *Phillips Brooks House Association*, Cambridge, MA, United States  
Volunteering as a tutor for children from the rough neighborhood of Mission Hill.

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## Publications

- 2023 **B. Grooten**, T. Tomilin, G. Vasani, M. Taylor, A. Mahmood, M. Fang, M. Pechenizkiy, D. Mocanu. *MaDi: Learning to Mask Distractions for Generalization in Visual Deep Reinforcement Learning*. Under review at AAMAS'24, [pdf](#)
- 2023 A. Nowak, **B. Grooten**, D. Mocanu, J. Tabor. *Fantastic Weights and How to Find Them: Where to Prune in Dynamic Sparse Training*. NeurIPS'23, [arXiv](#)
- 2023 **B. Grooten**, G. Sokar, S. Dohare, E. Mocanu, M. Taylor, M. Pechenizkiy, D. Mocanu. *Automatic Noise Filtering with Dynamic Sparse Training in Deep Reinforcement Learning*. Full-paper at AAMAS'23 & Spotlight at SNN'23, [arXiv](#)
- 2023 W. Wesselink, **B. Grooten**, Q. Xiao, C. de Campos, M. Pechenizkiy. *Nerva: a Truly Sparse Implementation of Neural Networks*. SNN'23, [sparseneural.net](#) #28
- 2022 **B. Grooten**, J. Wemmenhove, M. Poot, J. Portegies. *Is Vanilla Policy Gradient Overlooked? Analyzing Deep Reinforcement Learning for Hanabi*. Adaptive and Learning Agents workshop at AAMAS'22, [arXiv](#)
- 2022 **B. Grooten**, G. Sokar, E. Mocanu, S. Dohare, M. Taylor, M. Pechenizkiy, D. Mocanu. *Towards Implementing Truly Sparse Connections in Deep RL Agents*. SNN'22, [sparseneural.net](#) #53
- 2021 **B. Grooten**. *Deep Reinforcement Learning for the cooperative card game Hanabi*. Master Thesis, [research.tue.nl](#)
- 2020 **B. Grooten**, B. Tulkens. *Programming in mathematics and physics classes*. Master Thesis, [research.tue.nl](#)

## Invited Talks

- 2023 **University of Calgary**, *Efficient Focus for Autonomous Agents*  
Calgary AB, Canada. Oct 26<sup>th</sup>, 2023.
- 2023 **University of Alberta**, *Efficient Focus for Autonomous Agents*  
Edmonton AB, Canada. Aug 25<sup>th</sup>, 2023. [Recording](#)
- 2023 **PyData**, *Automatic Noise Filtering*  
Eindhoven, Netherlands. Apr 26<sup>th</sup>, 2023.
- 2023 **ProDrive**, *Automatic Noise Filtering*  
Eindhoven, Netherlands. Feb 16<sup>th</sup>, 2023.
- 2022 **Jagiellonian University**, *Efficient AI for Autonomous Agents*  
Kraków, Poland. Jul 5<sup>th</sup>, 2022.

## Skills

### Technical

Python, Java, C++, Shell scripts  
PyTorch, JAX, TensorFlow  
Git, Slurm, Linux, HTML,  $\LaTeX$

### Social

Teampayer, Educator  
Perseverance, Creativity  
Leadership, To The Point

### Languages

Dutch, English (fluent), Spanish, German (basic)

## Awards

- 2023 Spotlight paper: Sparse Neural Networks workshop at ICLR
- 2023 AAMAS Scholarship recipient
- 2021 Cum laude MSc graduation
- 2014 Bèta award: student with highest grades in all STEM courses
- 2014 Cum laude graduation